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ABSTRACT

The purpose of this study was to calculate a correlation coefficient between criteria such as grades on various aspects of a biology course and affective behaviors. The sample consisted of 27 elementary education undergraduate students engaged in a biology course specifically designed to meet their needs. Inter-item correlation coefficients were calculated for all criteria, cognitive and noncognitive. The results indicate a high correlation between test grades and scores from a checklist of affective behaviors. Students' affective behavior scores also correlated comparatively high with achievement on laboratory and extraclass assignments. However, results indicate that a student's preference for biology did not correspond to any significant degree to his achievement in the course. (Author/BR)

# THE CORRELATION OF SELECTED AFFECTIVE BEHAVIORS WITH COGNITIVE PERFORMANCE IN A BIOLOGY COURSE FOR ELEMENTARY TEACHERS

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It is widely known that elementary school teachers spend more time teaching language arts, mathematics and social studies than they do presenting science. It is, likewise, generally held that elementary teachers as a group tend to be somewhat uncomfortable with science; at least they appear to possess less positive attitudes toward science than toward other subjects such as reading, writing and arithmetic.

Biology 105 at the University of Georgia was created to help produce future elementary school teachers with positive attitudes toward biological science. The course was taught initially during the spring quarter of 1974, the time of this study. The purpose of this study was to correlate the affective assessment measures used to evaluate students and the course with cognitive performance of the students.

## PROCEDURES

A subject preference scale was designed and administered to the students on the first day of class. This scale is shown in Figure 1. Students were asked to examine pairs of subjects and circle the one they liked best. The scales were identified by student ID numbers. Likewise, on the last day of class students were asked to respond to the same instrument. Individual student preferences for biology were determined by counting the number of times "biology" was circled in comparison to other subjects. Likewise, preference for "science" was calculated by counting the number of times a student circled science courses versus non-science courses.

A checklist of student affective behaviors (shown in Figure 2) was designed by the investigator and each of the four instructors assigned to this course maintained a record on each of the twenty-seven students throughout the entire quarter. A unique feature allowing more objectivity with this technique than is usually possible was the fact that during the initial offering of this course

# SUBJECT PREFERENCE SCALE

Below are pairs of subjects which you are familiar with. As you glance at each pair, circle the subject which you like best. Do not sign your name on this paper.

Mathematics--Chemistry

Sociology--Physics

History--Sociology

Psychology--Geology

Geology--Chemistry

Psychology--Biology

Mathematics--Geography

Geology--Biology

Physics--Chemistry

Biology--Chemistry

English--Geography

Geography--Biology

Mathematics--Sociology

History--Geology

English--Sociology

Geography--Geology

Mathematics--History

Psychology--Sociology

History--Chemistry

English--Physics

English--Psychology

Geology--Physics

Sociology--Chemistry

English--Biology

Mathematics--Physics

English--Chemistry

History--Biology

Sociology--Geology

Psychology--Chemistry

Geography--Physics

Psychology--History

Biology--Physics

English--Geology

Geography--Chemistry

History--Geography

Mathematics--English

Sociology--Biology

Mathematics--Psychology

History--English

Psychology--Physics

Mathematics--Geology

Sociology--Geography

Psychology--Geography

History--Physics

Mathematics--Biology

I.D. NUMBER

5 = Almost always
4 = Frequently
3 = occasionally
2 = Seldomly
1 = Almost never

Figure 2

CHECKLIST OF STUDENT AFFECTIVE BEHAVIORS

| | Attends class punctually and regularly | Appears attentive during class presentations and discussions | Appears to plan ahead for activities and assign-ments | Expresses ideas freely during class dis-cussion | Participates in class activities in a serious and thorough fashion | Stays after class for additional discussion or followup activities |
|---|---|---|---|---|---|---|
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| 24. | | | | | | |

each of the four instructors met with the students everyday. This allowed maximum time for each instructor to get to know all the students individually plus allowed time for lengthy observation. The instructors did not discuss their rating of students until the course was over. Post-course discussions revealed high agreement among instructors toward the various categories when applied to the students. Within each category students were rated from "5" to "1," ranging from "almost always" to "almost never."

In addition to data from the subject preference scale and checklist of student affective behaviors, scores indicative of student achievement in cognitive areas were also tabulated. During BIO 105 students were administered three unit tests in addition to a final examination (which was optional). The total list of criteria for which student scores were obtained is shown below:

1. course achievement tests
2. laboratory and extraclass assignments
3. instructor ratings via student checklist of affective behaviors
4. student pretest preference for biology
5. student posttest preference for biology
6. pretest administration of Wisconsin Inventory of Science (WISP)
7. posttest administration of WISP
8. student pretest preference for science
9. student posttest preference for science

Inter-item coefficients of correlation were computed among the above criteria.

## SUMMARY OF FINDINGS

A complete listing of inter-item correlation coefficients are presented in Table 1. Final grades for students in this course were assigned primarily on the

Table 1

INTER-ITEM COEFFICIENTS OF CORRELATION AMONG COGNITIVE AND AFFECTIVE EVALUATIVE MEASURES

| | course achievement tests | laboratory extraclass assignments | affective behaviors checklist | pretest preference biology | posttest preference biology | pretest WISP | posttest WISP | pretest preference science | posttest preference science |
|---|---|---|---|---|---|---|---|---|---|
| course achievement tests | 1.00 | .64 | .84 | .13 | -.30 | .59 | .46 | .60 | .35 |
| laboratory extraclass assignments | .64 | 1.00 | .74 | .15 | -.02 | .32 | .38 | .24 | -.09 |
| affective behaviors checklist | .84 | .74 | 1.00 | .06 | -.30 | -.33 | .53 | .55 | .30 |
| pretest preference biology | .13 | .15 | .06 | 1.00 | .50 | .27 | .12 | -.25 | -.46 |
| posttest preference biology | -.30 | -.02 | -.30 | .50 | 1.00 | -.21 | -.20 | -.46 | -.71 |
| pretest WISP | .59 | .32 | .33 | .27 | -.21 | 1.00 | .51 | .28 | .27 |
| posttest WISP | .46 | .38 | .53 | .12 | -.20 | .51 | 1.00 | .29 | .22 |
| pretest preference science | .60 | .24 | .55 | -.25 | -.46 | .28 | .29 | 1.00 | .67 |
| posttest preference science | .35 | -.09 | .29 | -.46 | -.71 | .27 | .22 | .67 | 1.00 |

basis of performance on the three major tests and final examination. Grades on laboratory work and extraclass assignments were weighted such that they generally functioned to influence final letter grades only in cases where major discrepancies occurred or in "borderline" cases. One of the most noticeable findings in this study was the resulting high correlation between test grades and scores from the checklist of affective behaviors (r=.84). Student affective behavior scores also correlated comparatively high with achievement on laboratory and extraclass assignments (r=.74). Perhaps equally conspicuous in these data lack of positive correlation between subject preference and other evaluative criteria. Results in Figure 1 suggest that a student's preference for biology or science does not correspond to any significant degree to their achievement in the course. In fact, in some instances the coefficients of correlation were negative. These findings raise questions for further study.